

FIG. 1

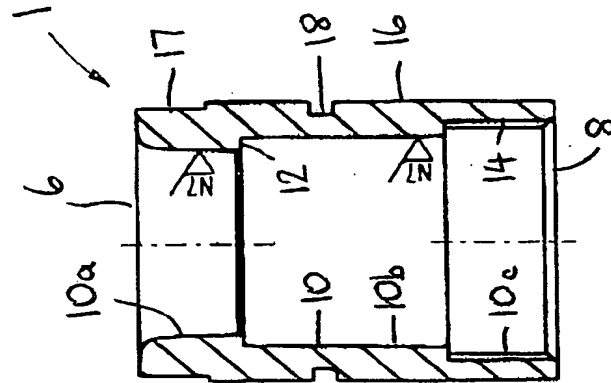


FIG. 2

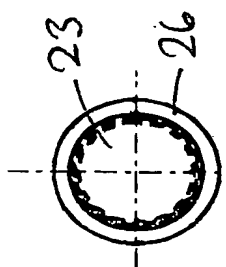


FIG. 5

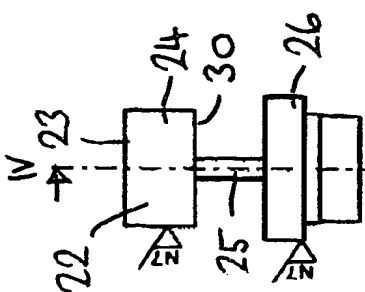


FIG. 3

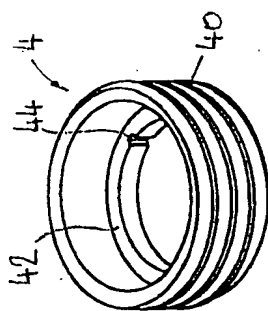


FIG. 6

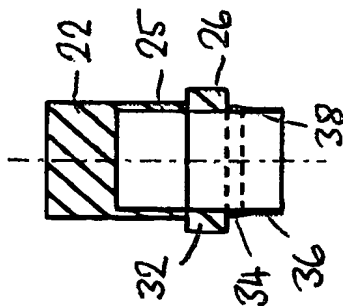
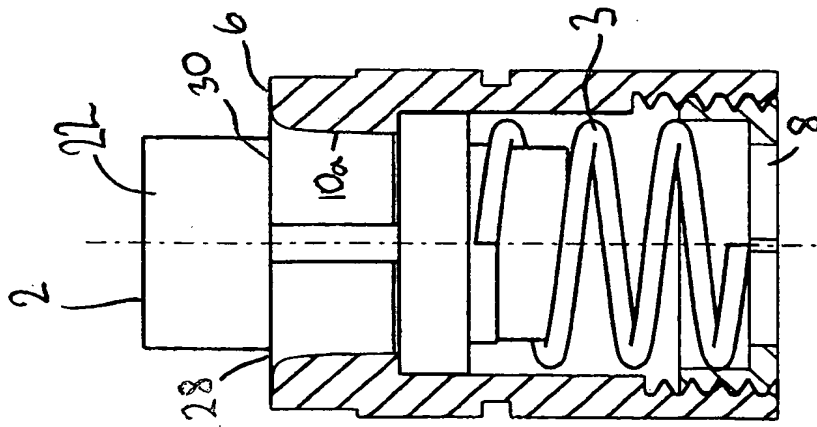
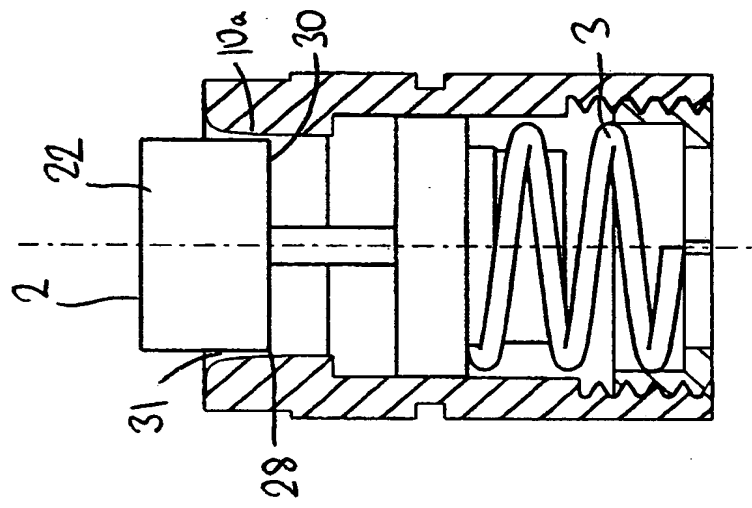


FIG. 4



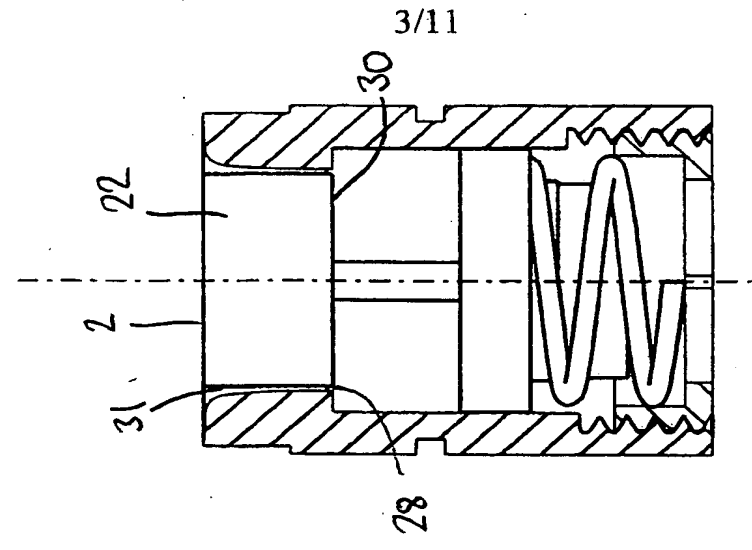
A) POSITION :- FULLY OPEN

Fig. 7



B) POSITION :- INTERMEDIATE OPEN

Fig. 8



C) POSITION :- FULLY CLOSED

Fig. 9

$$\frac{K_1(x-z)^2 + K_2(x-z)}{\rho g} = A_p(H_4 - H_3) - A_{H_{AV}}(H_3 - H_4)$$

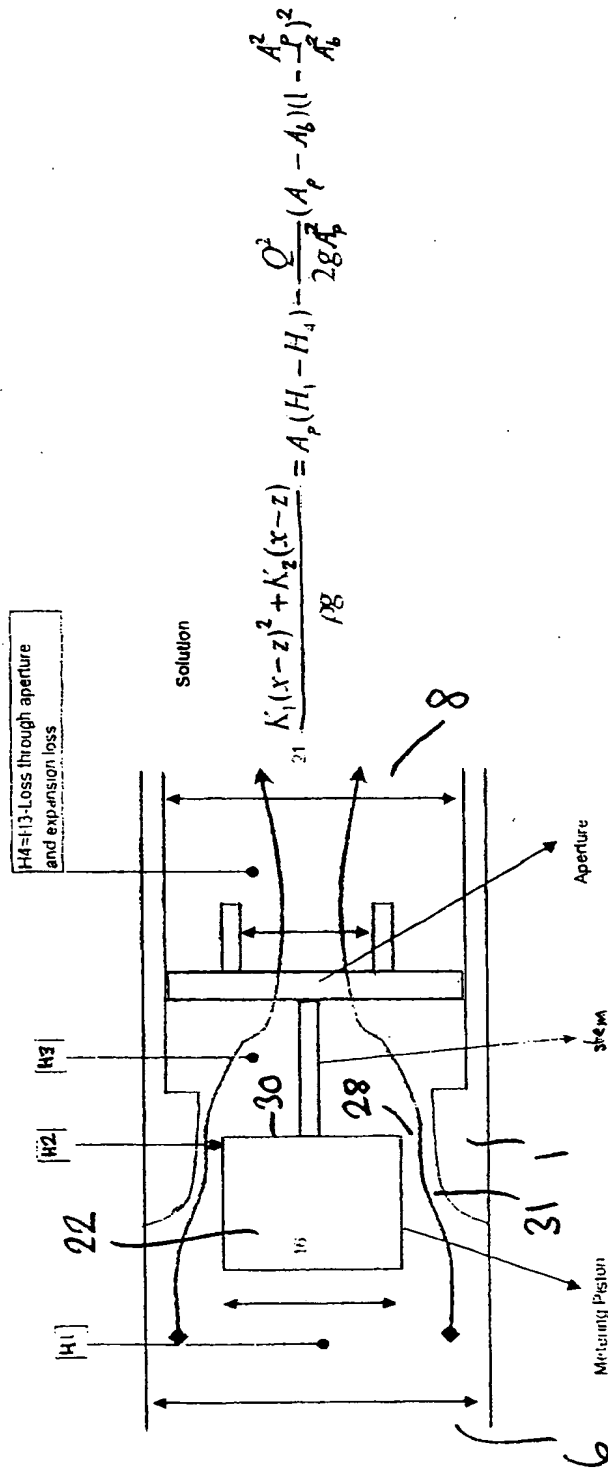


Fig.10

TYPICAL TRUMPET SIZES vs FLOW RATE

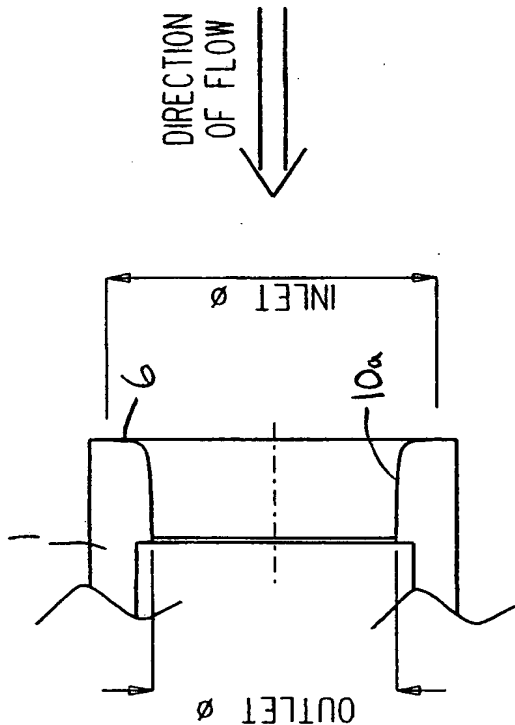


Fig. 11

SIZE	INLET DIA	OUTLET DIA	FLOW RATE l/s
3/4"	26.750	17.474	0.221
3/4"	26.626	19.059	1.199
1 1/4"	33.271	23.679	0.758
1 1/4"	31.422	24.357	1.263
2"	45.556	31.385	1.263
2"	45.575	33.343	3.157
3"	67.979	45.665	7.261

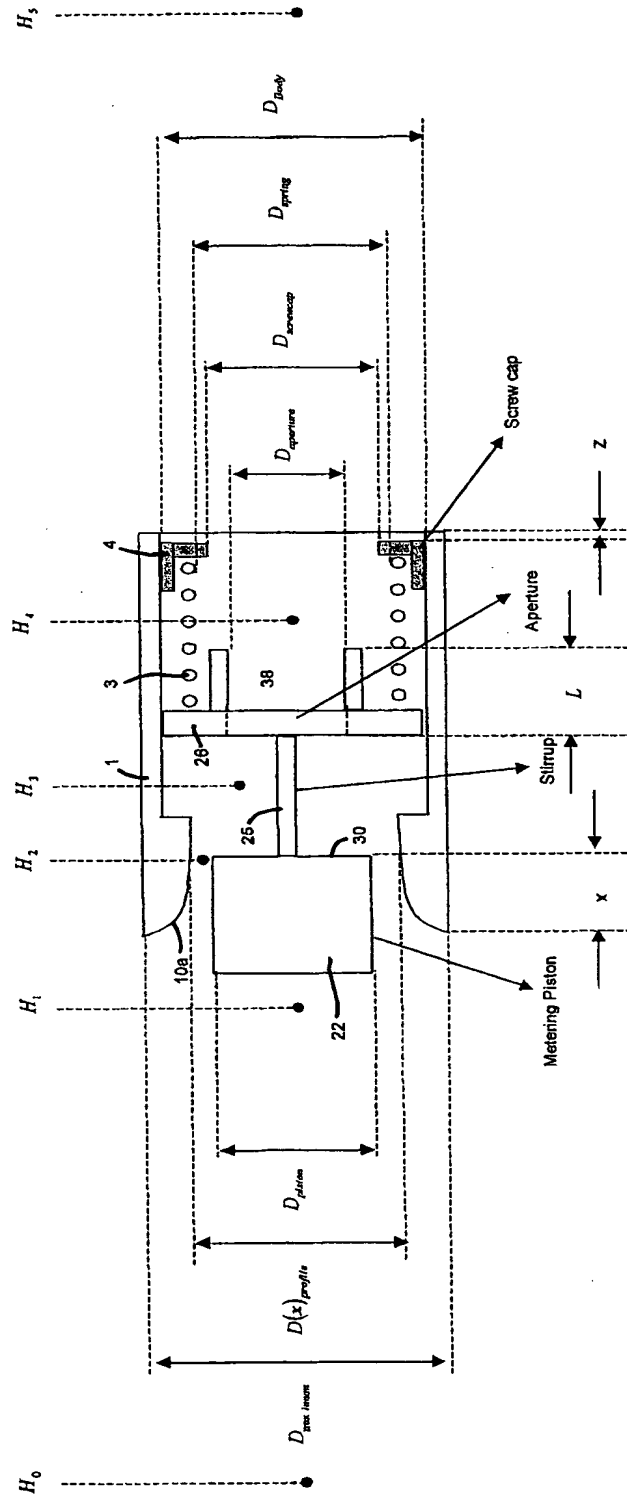
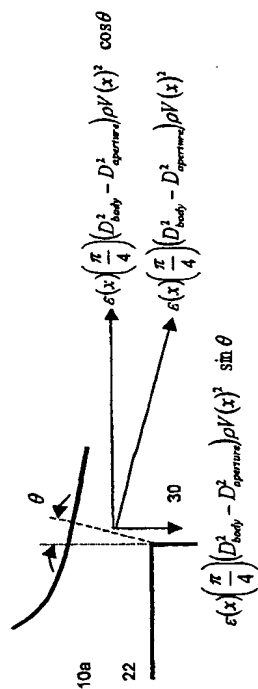
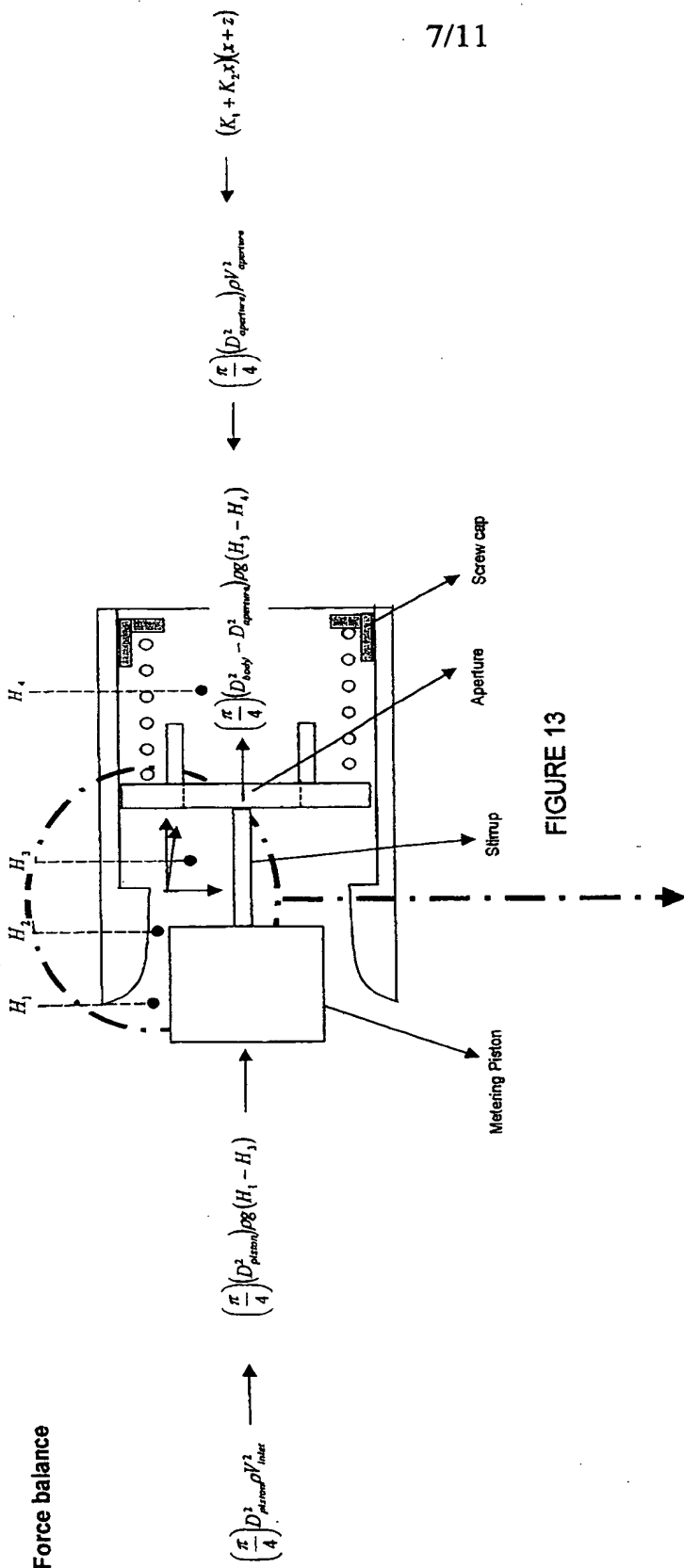
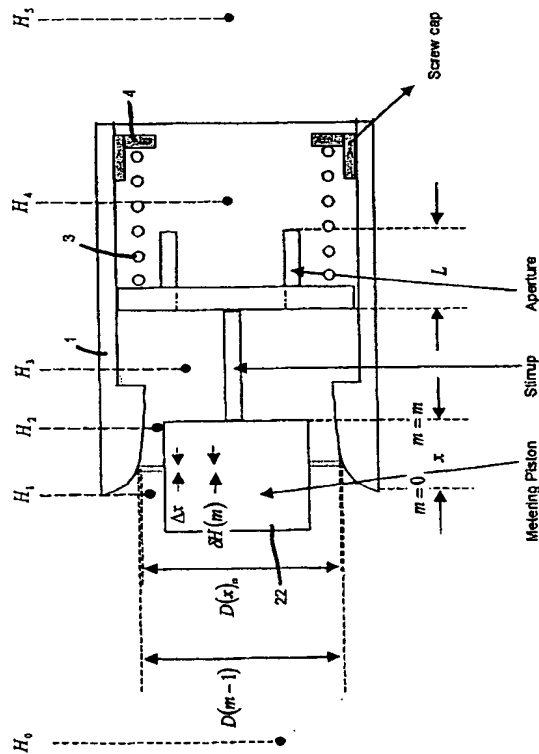


FIGURE 12



Forc exerted by the emergent annular jet



$$\Delta H(m) = 0.13125 \left[ f(x) - f(m-1) \right] \frac{\Delta x}{2} \frac{V(x)^2 + V^2(m-1)}{g} - D_{piston}$$

$$\text{where: } f_x = \frac{0.25}{\left[ \log \left( \frac{k_{profile}}{3.7 D(x)_{profile} - D_{piston}} + \frac{5.74}{\text{Re}(x)^{0.5}} \right) \right]^2} \quad \& \quad \text{Re}(x) = \frac{V(x) D(x)_{profile} - D_{piston}}{\nu}$$

$$H_1 - H_2 = \sum_{m=0}^m \Delta H(m)$$

$$H_3 - H_4 = \frac{1}{2g} \left[ \frac{Q}{C_s(x) \left( D(x)_{profile}^2 - D_{piston}^2 \right)} \right]^2$$

$$H_3 - H_4 = \left[ 1 - \frac{D_{piston}^2}{D^2} \right] \frac{V^2}{2g} + f_{aperture} \frac{L}{D} \frac{V^2}{2g} + \frac{V^2}{2g} \frac{V^2}{2g}$$

$$\text{where: } f_{aperture} = \frac{0.25}{\left[ \log \left( \frac{k_{aperture}}{3.7 D_{aperture}} + \frac{5.74}{\text{Re}_{aperture}} \right) \right]^2} \quad \& \quad \text{Re}_{aperture} = \frac{V_{aperture} D_{aperture}}{\nu}$$

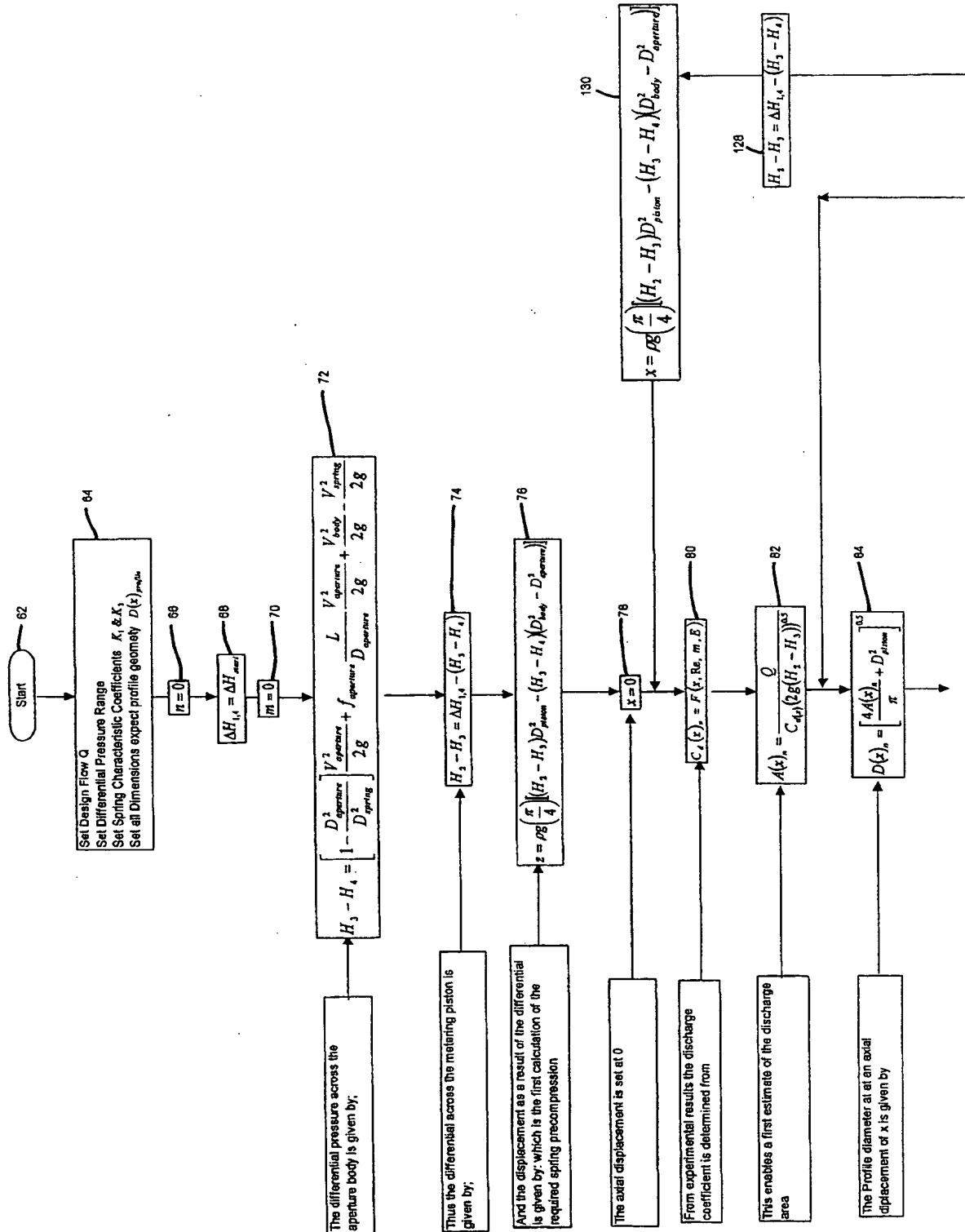
$$H_3 = H_4 + C_s(x) \frac{V^2}{2g}$$

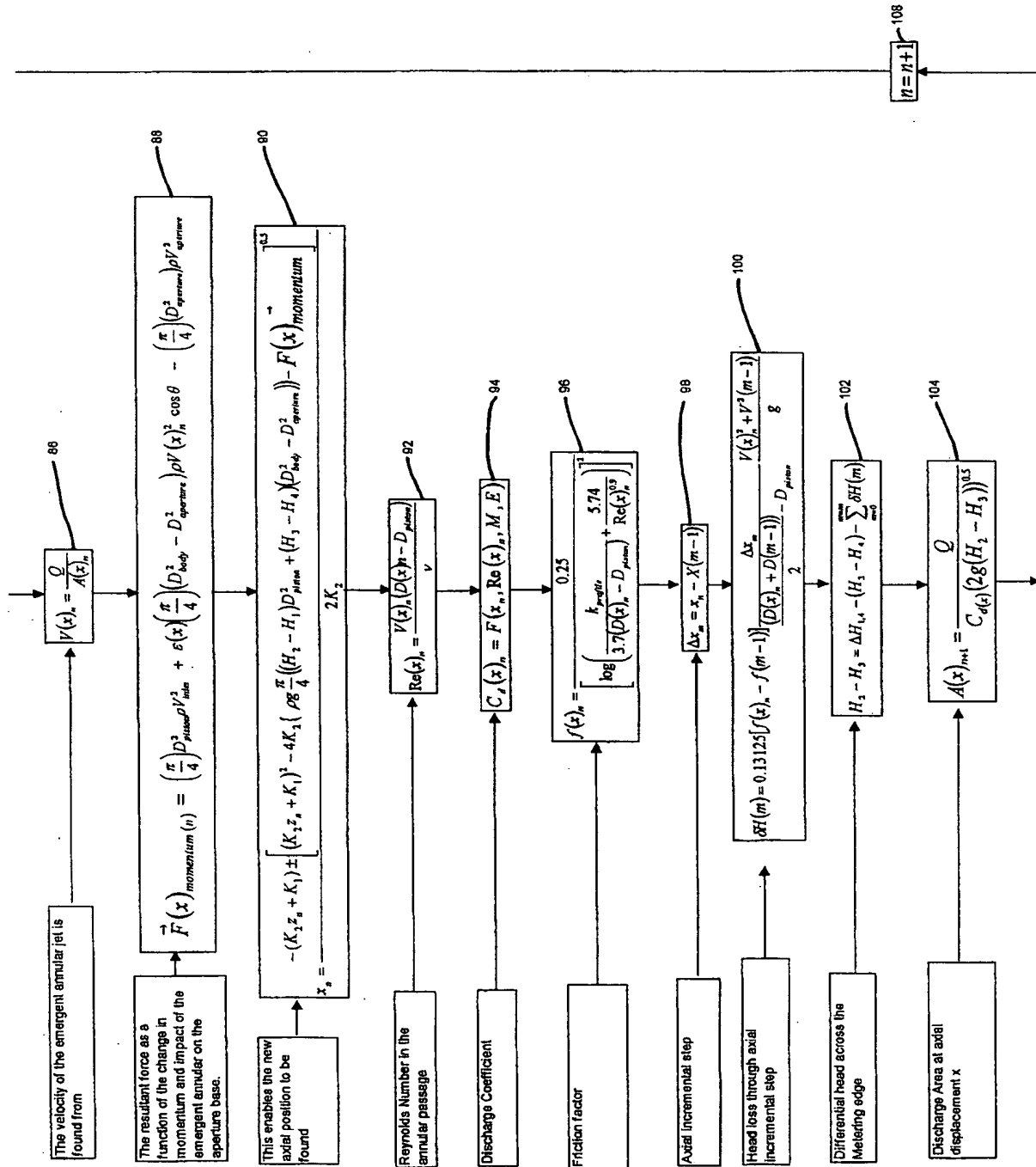
$$H_0 - H_1 = \zeta \frac{V^2}{2g}$$

FIGURE 15



9/11





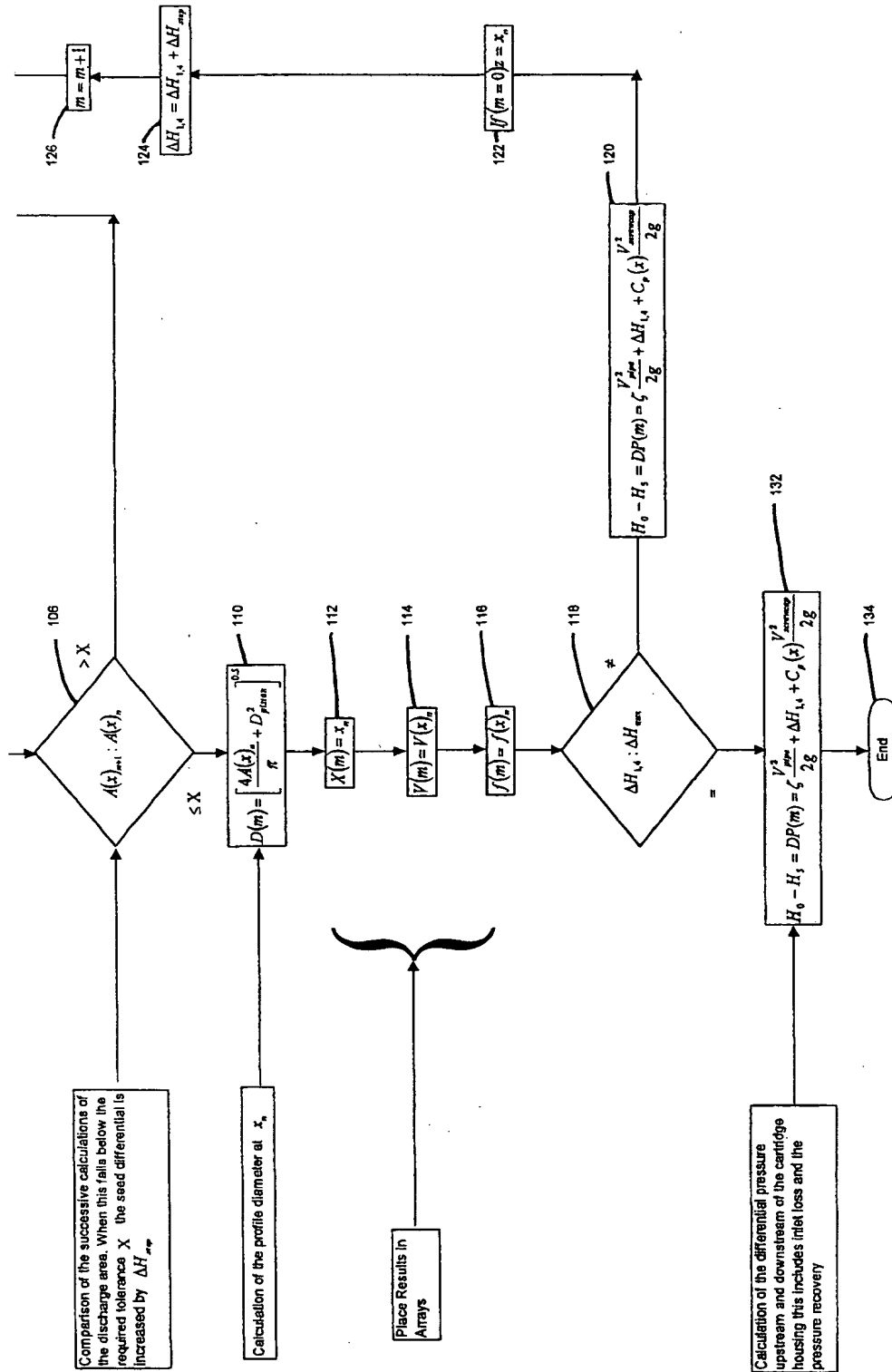


FIGURE 16